BIOTECHNOLOGICAL IMPROVEMENTS IN WINE PRODUCTION. VINE YEAST ADAPTED AT LOW TEMPERATURES.

JENIFER ROSA MIRANDA
1366473
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Universitat Autònoma de Barcelona

OBJECTIVES

- Discover some biotechnological improvements made during wine production for improvement.
- To know some metabolic characteristics of the yeasts used as well as the process of the alcoholic fermentation and the conditions of this process.
- To know, according to different authors, some types of biotechnological improvements that have been tried to make these vinous yeasts so that they are able to work at low temperatures with an efficient yield and without losing the characteristics that are conferred to the wine.
- Determine whether these improvements are cost-effective or not by assessing the different points of view and the type of work done taking into account materials, methods, conclusions

BIOTECHNOLOGICAL MODIFICATIONS

Plasmatic membrane: improve of fluidity by increasing the UFA content by uptake through the culture medium or by deletion of genes (*HMN, CRD1 and MUQI)* from the pathway of phospholipid synthesis or overexpression of *psdp1,* essential for the formation of UFA. (Table 1).

Sulfide assimilation and glutathione synthesis: improve of generation time (GT) by addition of GSH to the culture medium or precursor amino acids and without the presence of S-adenosylmethionine (SAM) (Figure 1)

Glycerol: Improvement of fermentative capacity by increasing the glycerol content through the overexpression of the glycerol-3-phosphatase dehydrogenase (GPD) enzyme at mitochondrial and cytosolic levels *GPD1* and *GPD2* (Figure 2).

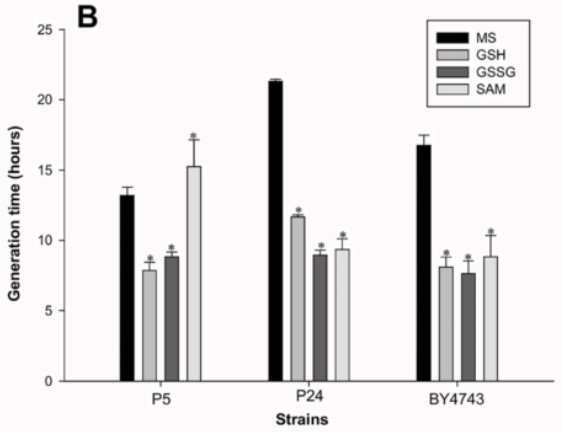

Figure 1: Time of generation (GT) of 3 strains (P5 - good growth at low temperatures; P24 - bad growth at low temperatures) in culture medium supplemented with GSH, GSSG and SAM) at 15ºC (García 2014)

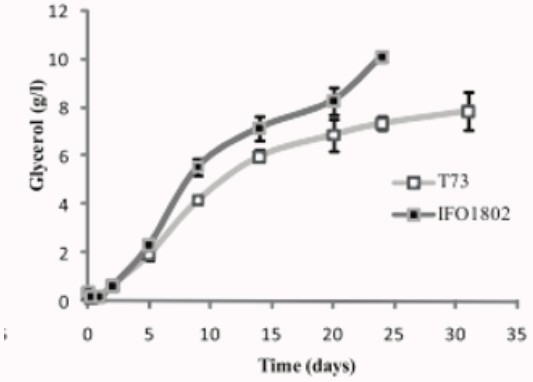

Figure 2: Glycerol production of two strains: *S cerevisiae* (T73) and *S. kudriavzevi* (IFO 1802) cryotolerant (Oliveira 2014).

		Dry yeast	*Must density 1000*	*Wine*
S. cerevisiae (25ºC)				
	MCFA	0	13.06	15.61
	SFA	29.92	59.82	55.93
	UFA	70.08	27.12	15.75
S. cerevisiae (13ºC)				
	MCFA	0	14.4	11.97
	SFA	29.92	43.61	41.37
	UFA	70.08	41.98	46.67

Table 1: Changes in the fatty acid profile of the membrane during fermentation in *Saccharomyces.* (Beltran et al., 2003)

CONCLUSIONS

There are a lot of stresses that the yeast is subjected in the production of wine. Therefore, we find a wide variety of biotechnological modifications to these, not only to improve the yield but also to achieve wines with better aromatic profiles, more functional or more adaptable to different needs.

The experiments performed with better results have been in which the fatty acid profile of the plasma membrane was modified taking into account the routes of synthesis of phospholipids and the concentration of fatty acids.